Coproduction Learning Health Systems: Empowering and Accelerating Real-World Improvement, Leadership, and Research

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12th Annual Nursing Research Evidence-Based Practice Symposium

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About your keynote speaker…

MS specialist (MSCN) nurse practitioner (FNP, PMHNP) with 18 years experience in in MS clinical care, subspecializing in neurobehavioral health.

Director, Chronic Health Improvement Research Program at Dartmouth

- Associate Professor at Geisel School of Medicine and the Dartmouth Institute
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National core faculty for Department of Veterans Affairs VAQS and HPEER post-doctoral fellowship programs in healthcare quality, improvement science, and health systems redesign. Leads national improvement methods and analysis curriculum for the VAQS fellowship program.

Principal Investigator of the first national multi-center healthcare improvement science research collaborative (2017-2020) for MS in the United States (MS-CQI).

To learn more about Dr. Oliver, see https://tdi.dartmouth.edu/about/our-people/directory/brant-oliver-phd-ms-mph-fnp-bc-pmhnp-bc
To learn more about CHIRP, see https://chronichealthimprovement.org/

Overview

- Learning about us
- The problem of “one more thing”…
- Setting the stage for Coproduction Learning Health Systems
- Building a Coproduction Learning Health System
- Example: The MS-CQI Collaborative
- Breakout discussions
- A new equation…

Learning about us…

Two poll questions:

1) What activities are you engaged in?

2) What gets in the way?

The Problem of “One More Thing”

A system designed to learn slowly…

"Every system is perfectly designed to get the results it gets."

Paul Batalden*

Professor Emeritus, the Dartmouth Institute (TDI)

Co-Founder and Senior Fellow, Institute for Healthcare Improvement (IHI)

On average, it takes between 17-19 years to get a new evidence based treatment or intervention from bench to bedside, and even after it gets implemented, there is substantial variation in how it is implemented in actual practice… we have to accelerate implementation and simultaneously study it…

*Dr. Batalden is considered by many to be one of the leading scholars in the development of the modern quality improvement era in healthcare. His accomplishments include clinical microsystems theory and most recently, healthcare coproduction theory. He founded the IHI along with Don Berwick.

To learn more about Dr. Batalden, visit: https://sites.dartmouth.edu/coproduction/our-team/paul-batalden/.

Systems focus is relatively new…

Biomedical and health sciences research and development has historically been based in three silos (and these remain the predominant categories now)…

1. Bench
2. Clinical trials
3. Population-based epidemiology

Systems-level research emerged in the latter half of the 20th century, prompted by the pivotal IOM reports "*To Err is Human*" (safety) and "*Crossing the Quality Chasm*" (quality), which described the failure of the U.S. healthcare system to attain high quality and safety standards despite having the most resources dedicated to healthcare of any industrialized nation.

IOM recommendations: The future of healthcare is in Learning Health Systems

To Err is Human: https://pubmed.ncbi.nlm.nih.gov/25077248/
Crossing the Quality Chasm: https://pubmed.ncbi.nlm.nih.gov/25057539/

Context is everything…

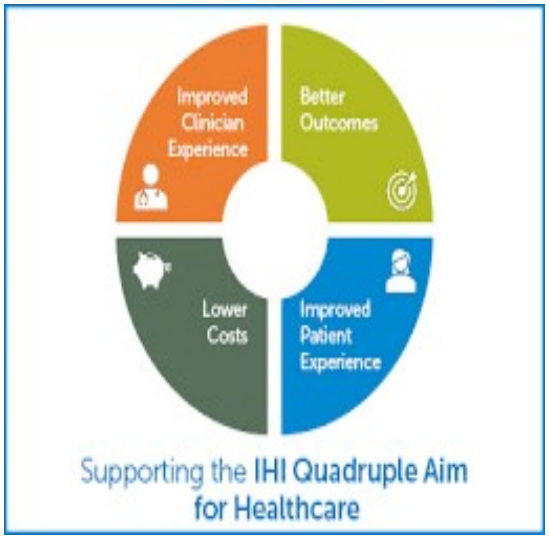
Wennberg's seminal health policy research on "small area variation" exposed a new reality and created a new focus on systems and variation… he found that evidence based practice is often overshadowed by local practice culture and environmental context…

- Supplier-induced demand
- Unwarranted variation in utilization
- Over- and underutilization of evidence-based care
- Social and behavioral determinants of health

"Geography is destiny" - John Wennberg*

*Dr. Wennberg is considered to be the father of small area variation science. He is the founder and former director of the Dartmouth Institute for Health Policy and Clinical Practice and the Dartmouth Atlas of Healthcare. To learn more about Dr. Wennberg, see https://tdi.dartmouth.edu/about/our-people/directory/john-e-wennberg-md-mph

Towards System Level Outcomes



AHRQ Healthcare Quality Domains:
https://www.ahrq.gov/talkingquality/measures/six-domains.html

IOM Domains of Healthcare Quality

•**Safe**: Avoiding harm to patients from the care that is intended to help them.

•**Effective**: Providing services based on scientific knowledge to all who could benefit and refraining from providing services to those not likely to benefit (avoiding underuse and misuse, respectively).

•**Patient-centered**: Providing care that is respectful of and responsive to individual patient preferences, needs, and values and ensuring that patient values guide all clinical decisions.

•**Timely**: Reducing waits and sometimes harmful delays for both those who receive and those who give care.

•**Efficient**: Avoiding waste, including waste of equipment, supplies, ideas, and energy.

•**Equitable**: Providing care that does not vary in quality because of personal characteristics such as gender, ethnicity, geographic location, and socioeconomic status.

Towards Learning Health Systems

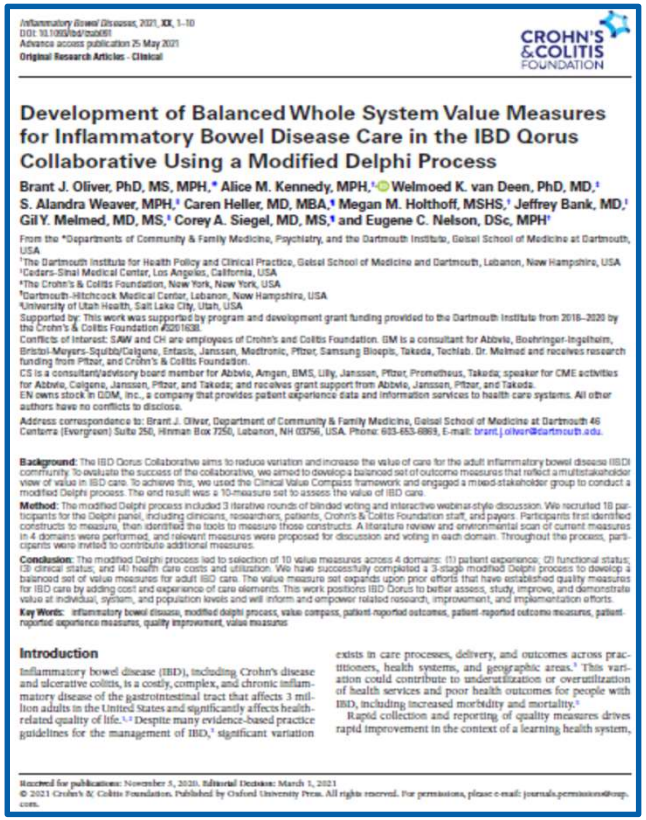
- Small area variation >> focus on systems impact on population health

- Systems focus + system-level measurement + informatics (EHRs) >>> registry-enabled Learning Health Systems (LHS)

- How to study and influence Learning Health Systems
  - Benchmarking
  - Innovation
  - Improvement
  - Implementation
  - EBP

AHRQ defines a learning health system as a health system in which internal data and experience are systematically integrated with external evidence, and that knowledge is put into practice. As a result, patients get higher quality, safer, more efficient care, and health care delivery organizations become better places to work. See: https://www.ahrq.gov/learning-health-systems/about.html

Whole system measurement: Present and future…



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Original Research Articles - Clinical

CROHN'S & COLITIS FOUNDATION

Development of Balanced Whole System Value Measures for Inflammatory Bowel Disease Care in the IBD Qorus Collaborative Using a Modified Delphi Process

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Conflicts of Interest: SAW and CH are employees of Crohn's and Colitis Foundation. BM is a consultant for Abbvie, Boehringer-Ingelheim, Bristol-Meyers-Squibb/Celgene, Entasis, Janssen, Medtronic, Pfizer, Samsung Bioepis, Takeda, Techlab. Dr. Melmed and receives research funding from Pfizer, and Crohn's & Colitis Foundation.
CS is a consultant/advisory board member for Abbvie, Amgen, BMS, Lilly, Janssen, Pfizer, Prometheus, Takeda; speaker for CME activities for Abbvie, Celgene, Janssen, Pfizer, and Takeda; and receives grant support from Abbvie, Janssen, Pfizer, and Takeda.
EN owns stock in CDM, Inc., a company that provides patient experience data and information services to health care systems. All other authors have no conflicts to disclose.

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Background: The IBD Qorus Collaborative aims to reduce variation and increase the value of care for the adult inflammatory bowel disease (IBD) community. To evaluate the success of the collaborative, we aimed to develop a balanced set of outcome measures that reflect a multistakeholder view of value in IBD care. To achieve this, we used the Clinical Value Compass framework and engaged a mixed-stakeholder group to conduct a modified Delphi process. The end result was a 10-measure set to assess the value of IBD care.

Method: The modified Delphi process included 3 iterative rounds of blinded voting and interactive webinar-style discussion. We recruited 18 participants for the Delphi panel, including clinicians, researchers, patients, Crohn's & Colitis Foundation staff, and payers. Participants first identified constructs to measure, then identified the tools to measure those constructs. A literature review and environmental scan of current measures in 4 domains were performed, and relevant measures were proposed for discussion and voting in each domain. Throughout the process, participants were invited to contribute additional measures.

Conclusion: The modified Delphi process led to selection of 10 value measures across 4 domains: (1) patient experience, (2) functional status, (3) clinical status, and (4) health care costs and utilization. We have successfully completed a 3-stage modified Delphi process to develop a balanced set of value measures for adult IBD care. The value measure set expands upon prior efforts that have established quality measures for IBD care by adding cost and experience of care elements. This work positions IBD Qorus to better assess, study, improve, and demonstrate value at individual, system, and population levels and will inform and empower related research, improvement, and implementation efforts.

Key Words: inflammatory bowel disease, modified delphi process, value compass, patient-reported outcomes, patient-reported outcome measures, patient-reported experience measures, quality improvement, value measures

Introduction

Inflammatory bowel disease (IBD), including Crohn's disease and ulcerative colitis, is a costly, complex, and chronic inflammatory disease of the gastrointestinal tract that affects 3 million adults in the United States and significantly affects health-related quality of life.[1,2] Despite many evidence-based practice guidelines for the management of IBD,[3] significant variation exists in care processes, delivery, and outcomes across practitioners, health systems, and geographic areas.[4] This variation could contribute to underutilization or overutilization of health services and poor health outcomes for people with IBD, including increased morbidity and mortality.[5]

Rapid collection and reporting of quality measures drives rapid improvement in the context of a learning health system,

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https://pubmed-ncbi-nlm-nih-gov.dartmouth.idm.oclc.org/34037211/

Open access **Protocol**

BMJ Open

COproduction VALUE creation in healthcare service (CO-VALUE): an international multicentre protocol to describe the application of a model of value creation for use in systems of coproduced healthcare services and to evaluate the initial feasibility, utility and acceptability of associated system-level value creation assessment approaches

Brant J Oliver ,[1] Paul B Batalden,[1] Peter Rocco DiMilla ,[2] Rachel C Forcino ,[1] Tina C Foster,[1] Eugene C Nelson,[1] Boel Andersson Gäre[3]

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ABSTRACT

Introduction Coproduction introduces a fundamental shift in how healthcare service is conceptualised. The mechanistic idea of healthcare being a 'product' generated by the healthcare system and delivered to patients is replaced by that of a service co-created by the healthcare system and the users of healthcare services. Fjeldstad *et al* offer an approach for conceptualising value creation in complex service contexts that we believe is applicable to coproduction of healthcare service. We have adapted Fjeldstad's value creation model based on a detailed case study of a renal haemodialysis service in Jonkoping, Sweden, which demonstrates coproduction characteristics and key elements of Fjeldstad's model.

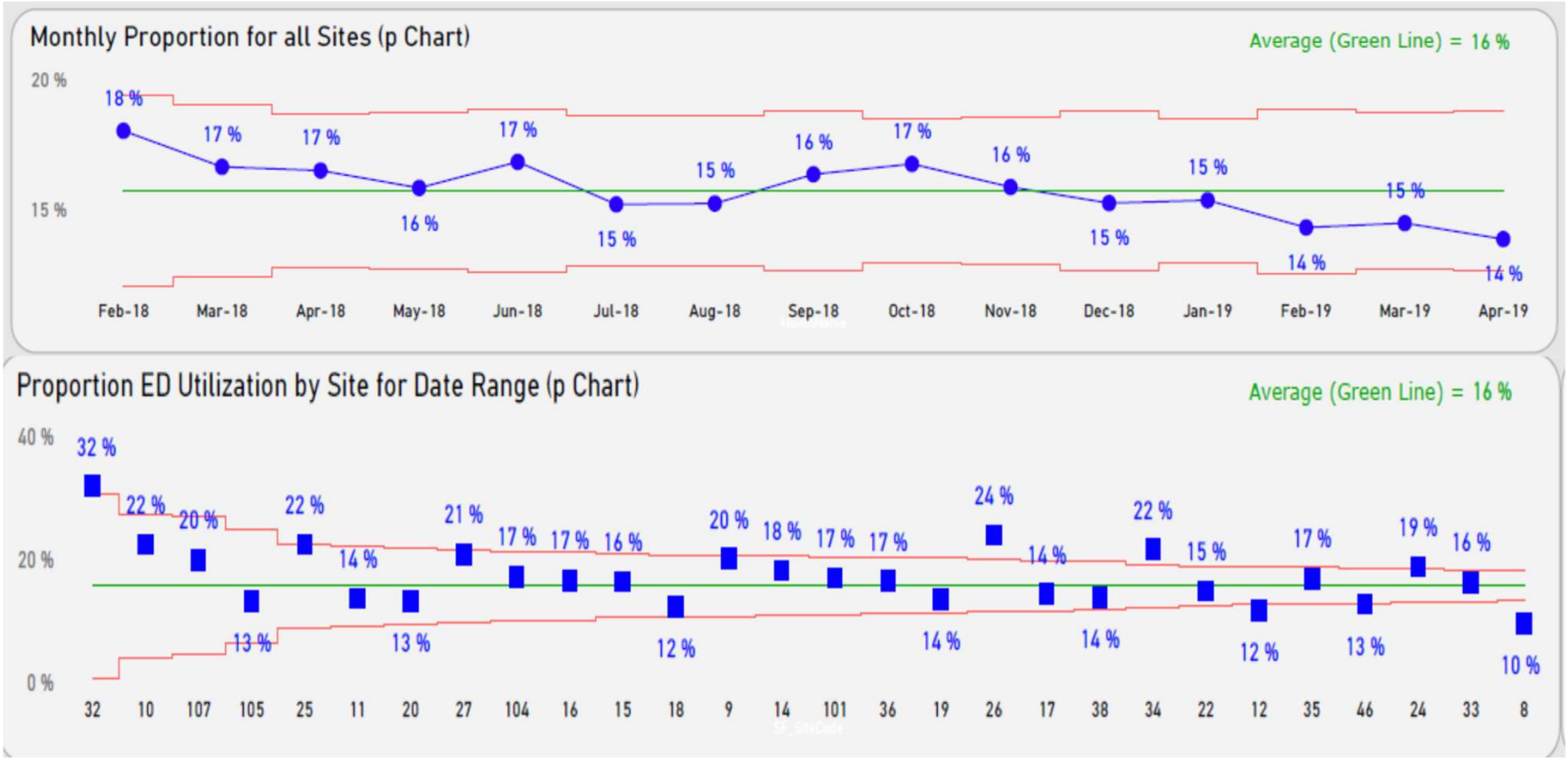
Methods and analysis We propose a five-part coproduction value creation model for healthcare service: (1) *value chain*, characterised by a standardised set of processes that serve a commonly occurring need; (2) *value shop*, which offers a customised response for unique cases; (3) a *facilitated value network*, which involves groups of individuals struggling with similar challenges; (4) *interconnection* between shop, chain and network elements and (5) *leadership*. We will seek to articulate and assess the value creation model through the work of a community of practice comprised of a diverse international workgroup with representation from executive, financial and clinical leaders as well as other key stakeholders from multiple health systems. We then will conduct pilot studies of a qualitative self-assessment process in participating health systems, and ultimately develop and test quantitative measures for assessing coproduction value creation.

Ethics and dissemination This study has been approved by the Dartmouth-Hitchcock Health Institutional Review Board (D-HH IRB) as a minimal risk research study. Findings and scholarship will be disseminated broadly through continuous engagement with health system stakeholders, national and international academic presentations and publications and an internet-based electronic platform for publicly accessible study information.

Strengths and limitations of this study

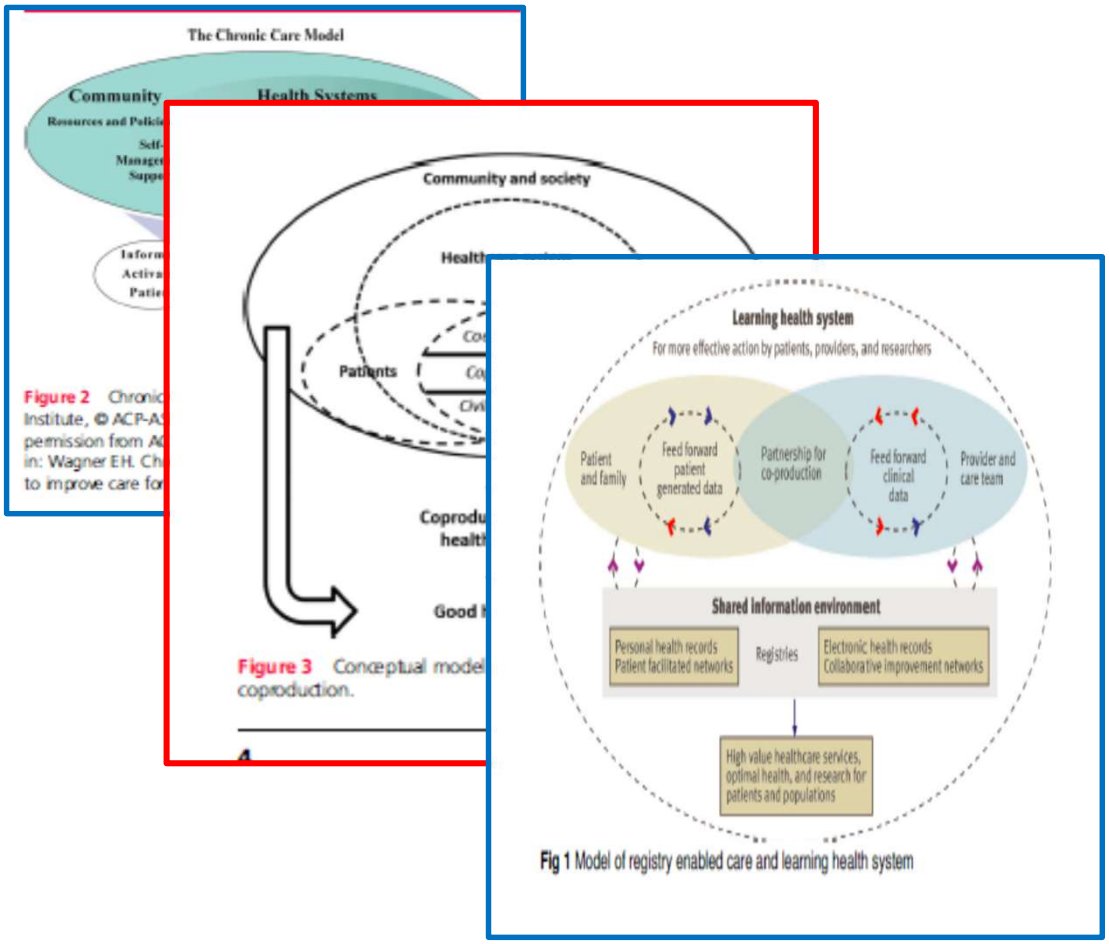
- The CO-VALUE study is an international, multisite protocol adapting a novel conceptual model for coproduction value creation and assessment in healthcare services.
- The international, multisite application of a value creation model for coproduction and its assessment in healthcare services could provide useful information for both applied and research communities.
- A community of practice consisting of executive, financial and clinical leaders as well as patients, facilitators and advocates from four countries has been established to guide each phase of this study.
- CO-VALUE is designed to leverage substantial diversity in participating health systems in hopes of yielding a generalisable model for coproduction value creation, but this large degree of diversity also introduces heterogeneity limitations.
- This is not an effectiveness study and is neither randomised nor blinded.
- Rather, it aims to apply and optimise qualitative and quantitative methods for coproduction value creation assessment in initial evaluations of feasibility, usability and utility.

https://bmjopen.bmj.com/content/bmjopen/10/10/e037578.full.pdf/



Excerpt shared with permission, B. Oliver & Crohn's & Colitis Foundation (2020)

IBD Qorus Dynamic Reporting System



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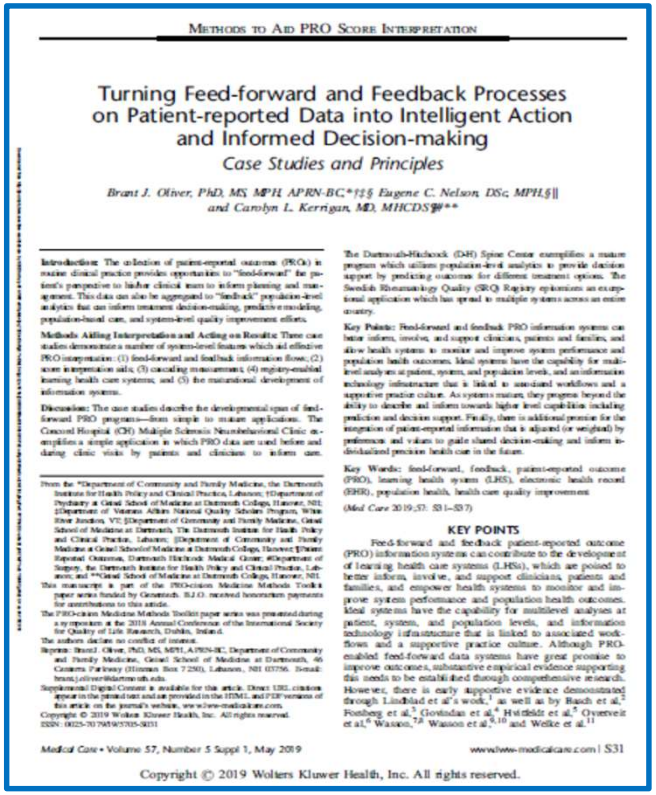
An evolutionary pathway (from left to right): Wagner Chronic Care Model, Coproduction of Healthcare Service, and Registry-Enabled Coproduction Learning Health Systems



METHODS TO AID PRO SCORE INTERPRETATION

Turning Feed-forward and Feedback Processes on Patient-reported Data into Intelligent Action and Informed Decision-making

Case Studies and Principles

Brant J. Oliver, PhD, MS, MPH, APRN-BC,†‡§ Eugene C. Nelson, DSc, MPH,§‖ and Carolyn L. Kerrigan, MD, MHCDS¶#***

Introduction: The collection of patient-reported outcomes (PROs) in routine clinical practice provides opportunities to "feed-forward" the patient's perspective to his/her clinical team to inform planning and management. This data can also be aggregated to "feedback" population-level analytics that can inform treatment decision-making, predictive modeling, population-based care, and system-level quality improvement efforts.

Methods: Aiding Interpretation and Acting on Results: These case studies demonstrate a number of system-level features which aid effective PRO interpretation: (1) feed-forward and feedback information flows; (2) score interpretation aids; (3) cascading measurement; (4) registry-enabled learning health care systems; and (5) the maturational development of information systems.

Discussion: The case studies describe the developmental span of feed-forward PRO programs—from simple to mature applications. The Concord Hospital (CH) Multiple Sclerosis Neurobehavioral Clinic exemplifies a simple application in which PRO data are used before and during clinic visits by patients and clinicians to inform care.

The Dartmouth-Hitchcock (D-H) Spine Center exemplifies a mature program which utilizes population-level analytics to provide decision support by predicting outcomes for different treatment options. The Swedish Rheumatology Quality (SRQ) Registry epitomizes an exceptional application which has spread to multiple systems across an entire country.

Key Points: Feed-forward and feedback PRO information systems can better inform, involve, and support clinicians, patients and families, and allow health systems to monitor and improve system performance and population health outcomes. Ideal systems have the capability for multilevel analyses at patient, system, and population levels, and an information technology infrastructure that is linked to associated workflows and a supportive practice culture. As systems mature, they progress beyond the ability to describe and inform towards higher level capabilities including prediction and decision support. Finally, there is additional promise for the integration of patient-reported information that is adjusted (or weighted) by preferences and values to guide shared decision-making and inform individualized precision health care in the future.

Key Words: feed-forward, feedback, patient-reported outcome (PRO), learning health system (LHS), electronic health record (EHR), population health, health care quality improvement

(*Med Care* 2019;57: S31–S37)

KEY POINTS

Feed-forward and feedback patient-reported outcome (PRO) information systems can contribute to the development of learning health care systems (LHSs), which are poised to better inform, involve, and support clinicians, patients and families, and empower health systems to monitor and improve system performance and population health outcomes. Ideal systems have the capability for multilevel analyses at patient, system, and population levels, and information technology infrastructure that is linked to associated workflows and a supportive practice culture. Although PRO-enabled feed-forward data systems have great promise to improve outcomes, substantive empirical evidence supporting this needs to be established through comprehensive research. However, there is early supportive evidence demonstrated through Lindblad et al's work,[1] as well as by Basch et al,[2] Forsberg et al,[3] Govindan et al,[4] Hutchfeldt et al,[5] Overveit et al,[6] Watson,[7,8] Wasson et al,[9,10] and Welke et al.[11]

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The authors declare no conflict of interest.

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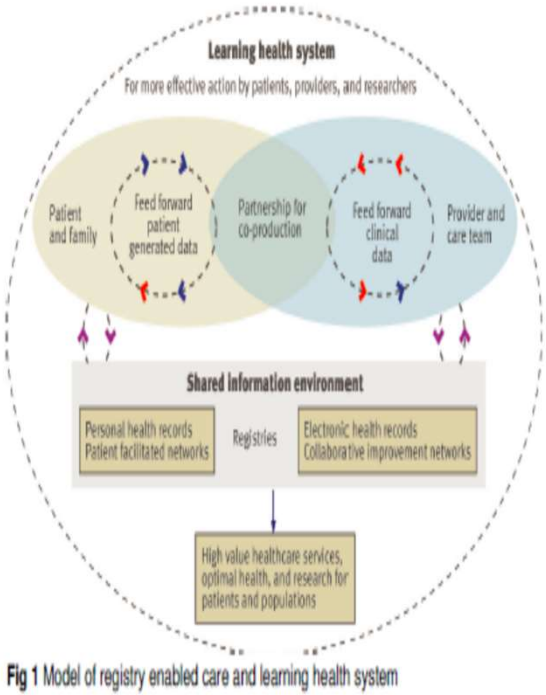


Fig 1 Model of registry enabled care and learning health system

https://www.bmj.com/content/354/bmj.i3319

LHS Components:

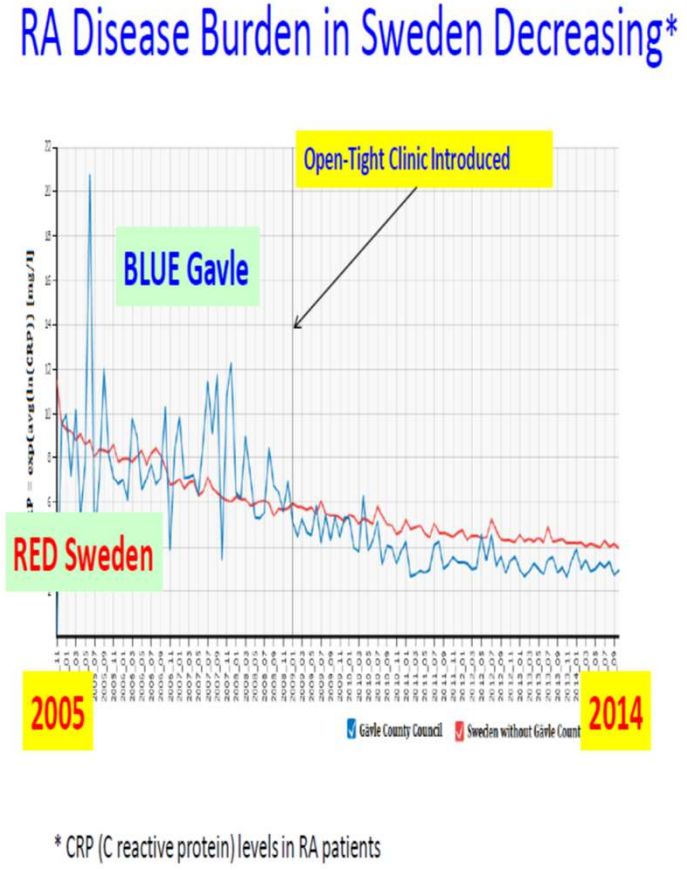
- Registry
- Feed-forward information
- Feedback information
- PRO, PROM, PREM data
- Clinical data
- Qualitative data

LHS Potential

- There is ***precedent for LHS improvement*** approaches in other complex, costly, chronic disease populations.

- In Sweden, a national-level LHS initiative using feed-forward PRO data to risk stratify ***rheumatoid arthritis*** population resulted in improved disease control and improved access to care (Lindblad et al., 2014).[1]

- In the United States, a randomized prospective study of 766 oncology patients demonstrated ***improved life expectancy*** in patients engaged in care using a PRO-based LHS approach (Basch et al., 2017).[2]

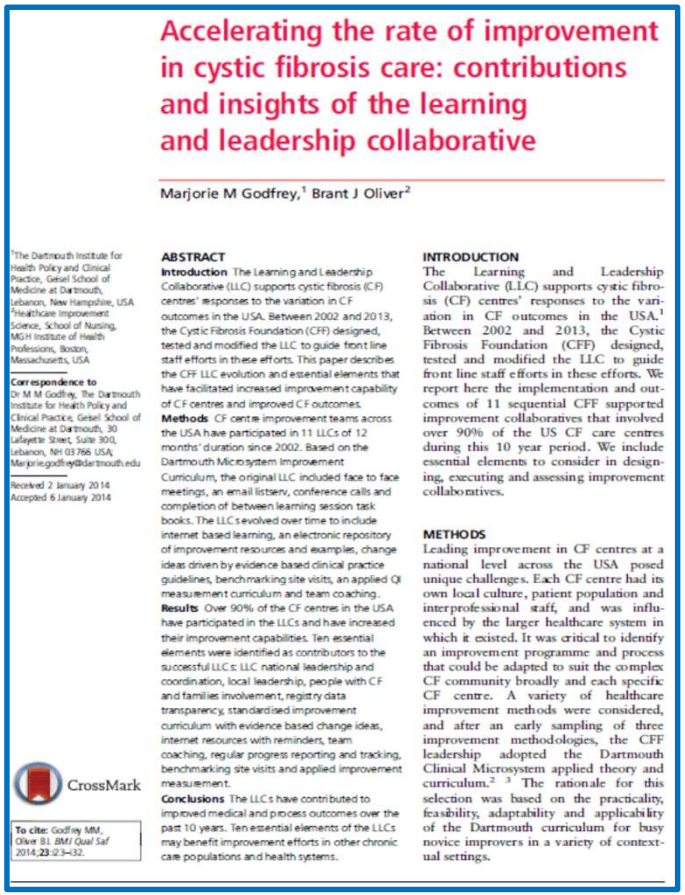


1. https://academic.oup.com/qjmed/article/110/3/125/2681814
2. https://jamanetwork.com/journals/jama/fullarticle/2630810

LHS Success

- Cystic Fibrosis Learning and Leadership Collaboratives[1]
- Cardiac Surgery (Norther New England Cardiovascular Network)[2]
- Neonatal Health (Vermont Oxford Network)[3]
- Inflammatory Bowel Disease (IBD Qorus, Improve Care Now)[4-5]

1. https://qualitysafety.bmj.com/content/23/Suppl_1/i23
2. http://www.nnecdsg.org/
3. https://public.vtoxford.org/
4. https://www.crohnscolitisfoundation.org/research/ibd-qorus
5. https://www.improvecarenow.org/



Accelerating the rate of improvement in cystic fibrosis care: contributions and insights of the learning and leadership collaborative

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ABSTRACT

Introduction The Learning and Leadership Collaborative (LLC) supports cystic fibrosis (CF) centres' responses to the variation in CF outcomes in the USA. Between 2002 and 2013, the Cystic Fibrosis Foundation (CFF) designed, tested and modified the LLC to guide front line staff efforts in these efforts. This paper describes the CFF LLC evolution and essential elements that have facilitated increased improvement capability of CF centres and improved CF outcomes.

Methods CF centre improvement teams across the USA have participated in 11 LLCs of 12 months' duration since 2002. Based on the Dartmouth Microsystem Improvement Curriculum, the original LLC included face to face meetings, an email listserv, conference calls and completion of between learning session task books. The LLCs evolved over time to include internet based learning, an electronic repository of improvement resources and examples, change ideas driven by evidence based clinical practice guidelines, benchmarking site visits, an applied QI measurement curriculum and team coaching.

Results Over 90% of the CF centres in the USA have participated in the LLCs and have increased their improvement capabilities. Ten essential elements were identified as contributors to the successful LLCs: LLC national leadership and coordination, local leadership, people with CF and families involvement, registry data transparency, standardised improvement curriculum with evidence based change ideas, internet resources with reminders, team coaching, regular progress reporting and tracking, benchmarking site visits and applied improvement measurement.

Conclusions The LLCs have contributed to improved medical and process outcomes over the past 10 years. Ten essential elements of the LLCs may benefit improvement efforts in other chronic care populations and health systems.

CrossMark

To cite: Godfrey MM, Oliver BJ. *BMJ Qual Saf* 2014;**23**:i23–i32.

INTRODUCTION

The Learning and Leadership Collaborative (LLC) supports cystic fibrosis (CF) centres' responses to the variation in CF outcomes in the USA.[1] Between 2002 and 2013, the Cystic Fibrosis Foundation (CFF) designed, tested and modified the LLC to guide front line staff efforts in these efforts. We report here the implementation and outcomes of 11 sequential CFF supported improvement collaboratives that involved over 90% of the US CF care centres during this 10 year period. We include essential elements to consider in designing, executing and assessing improvement collaboratives.

METHODS

Leading improvement in CF centres at a national level across the USA posed unique challenges. Each CF centre had its own local culture, patient population and interprofessional staff, and was influenced by the larger healthcare system in which it existed. It was critical to identify an improvement programme and process that could be adapted to suit the complex CF community broadly and each specific CF centre. A variety of healthcare improvement methods were considered, and after an early sampling of three improvement methodologies, the CFF leadership adopted the Dartmouth Clinical Microsystem applied theory and curriculum.[2 3] The rationale for this selection was based on the practicality, feasibility, adaptability and applicability of the Dartmouth curriculum for busy novice improvers in a variety of contextual settings.

https://qualitysafety.bmj.com/content/23/Suppl_1/i23

Building Blocks of a CLHS…

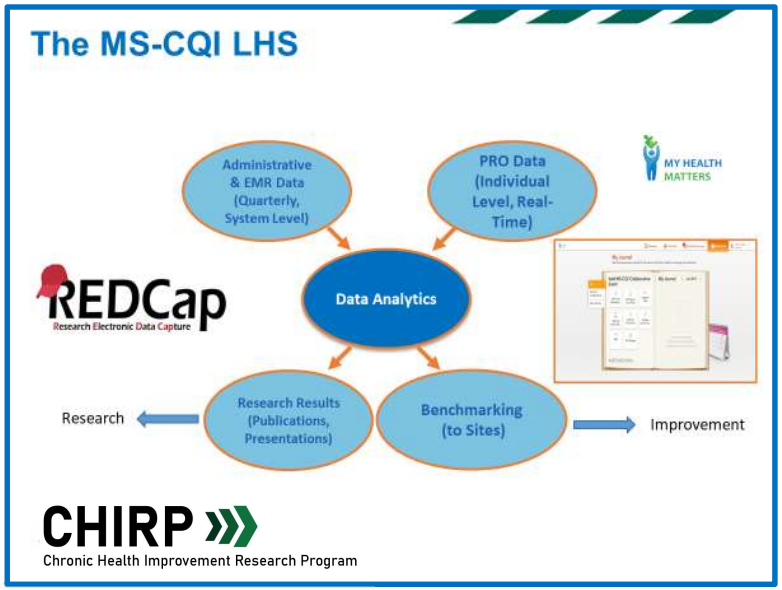
"Coproduction Center"

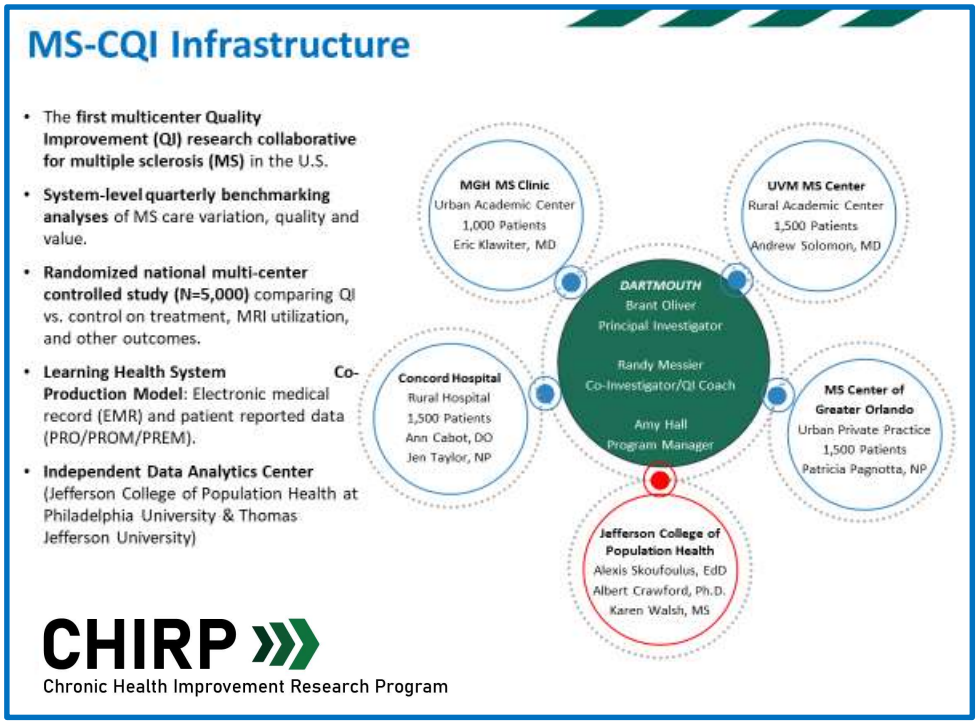
Feed-forward data

Feedback data

Patient-Focused Registry

Pioneering Improvement Science Research in MS: The MS-CQI Collaborative Study (2017-2020)





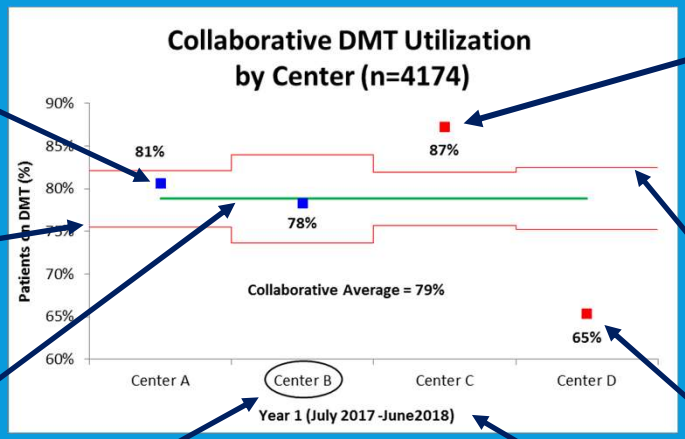
MS-CQI COLLABORATIVE
IMPROVING MS CARE TOGETHER

INFORMING IMPROVEMENT:
BENCHMARKING USING STATISTICAL PROCESS CONTROL (SPC)

This center (blue point) is not significantly different than the collaborative average (green line)

This (red line) is the Lower Control Limit (LCL), approximately 2.67 standard deviations below the collaborative average (green line)

This is the collaboratives' average performance (green line)



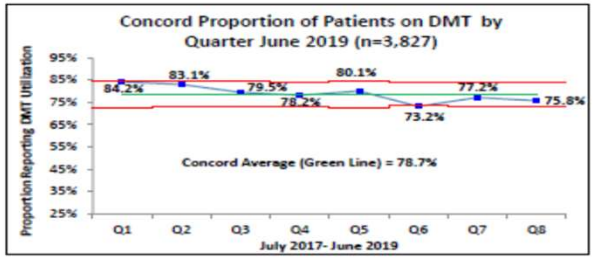
The circle identifies YOUR center

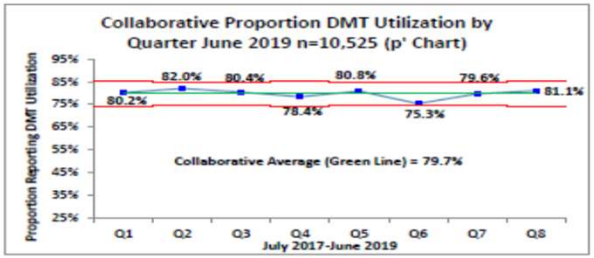
This shows the time period for the analysis

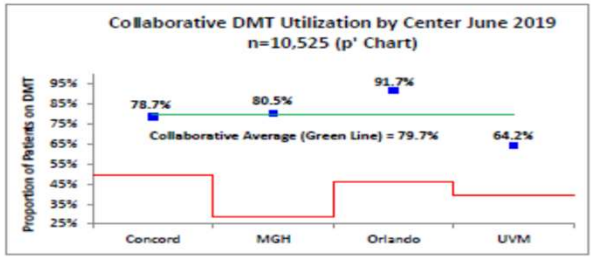
This center (red point) is significantly higher than the collaborative average (green line)

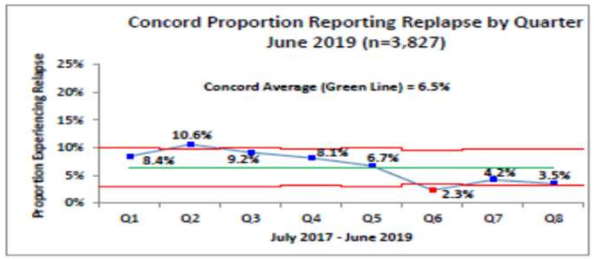
This (red line) is the Upper Control Limit (UCL), approximately 2.67 standard deviations above the collaborative average (green line)

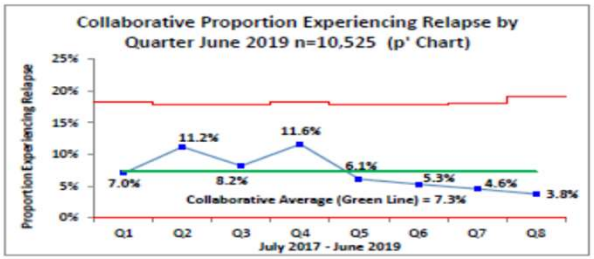
This center (red point) is significantly lower than the collaborative average (green line)

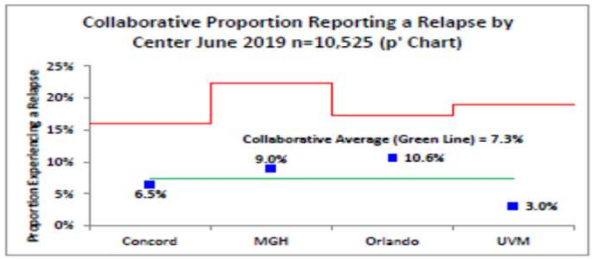

Concord Proportion of Patients on DMT by Quarter June 2019 (n=3,827)
Proportion Reporting DMT Utilization
84.2%
83.1%
79.5%
78.2%
80.1%
73.2%
77.2%
75.8%
Concord Average (Green Line) = 78.7%
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8
July 2017- June 2019

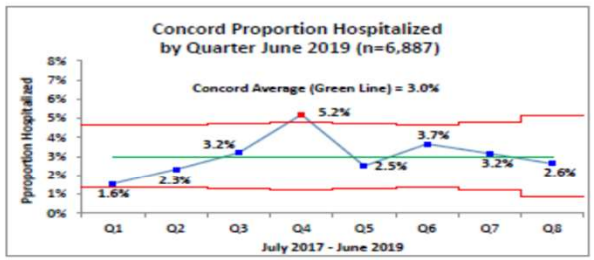

Collaborative Proportion DMT Utilization by Quarter June 2019 n=10,525 (p' Chart)
Proportion Reporting DMT Utilization
80.2%
82.0%
80.4%
78.4%
80.8%
75.3%
79.6%
81.1%
Collaborative Average (Green Line) = 79.7%
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8
July 2017-June 2019

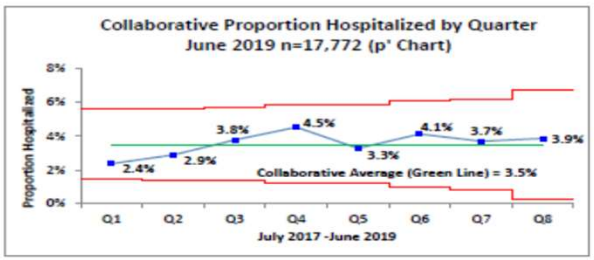

Collaborative DMT Utilization by Center June 2019 n=10,525 (p' Chart)
Proportion of Patients on DMT
78.7%
80.5%
91.7%
64.2%
Collaborative Average (Green Line) = 79.7%
Concord MGH Orlando UVM

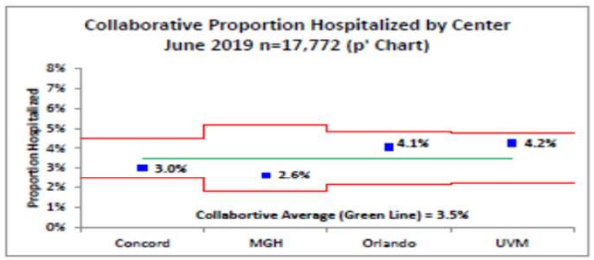

Concord Proportion Reporting Replapse by Quarter June 2019 (n=3,827)
Proportion Experiencing Relapse
Concord Average (Green Line) = 6.5%
8.4%
10.6%
9.2%
8.1%
6.7%
2.3%
4.2%
3.5%
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8
July 2017 - June 2019

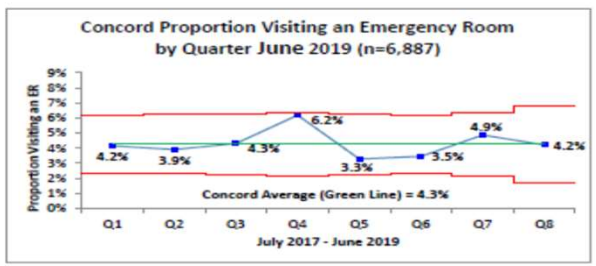

Collaborative Proportion Experiencing Relapse by Quarter June 2019 n=10,525 (p' Chart)
Proportion Experiencing Relapse
7.0%
11.2%
8.2%
11.6%
6.1%
5.3%
4.6%
3.8%
Collaborative Average (Green Line) = 7.3%
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8
July 2017 - June 2019

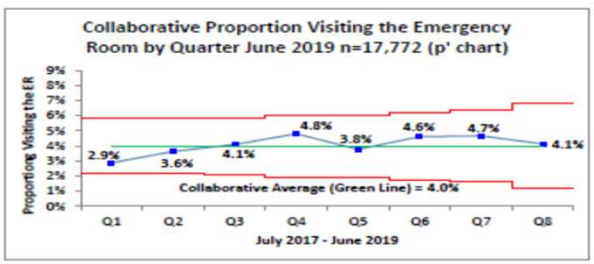

Collaborative Proportion Reporting a Relapse by Center June 2019 n=10,525 (p' Chart)
Proportion Experiencing a Relapse
Collaborative Average (Green Line) = 7.3%
6.5%
9.0%
10.6%
3.0%
Concord MGH Orlando UVM

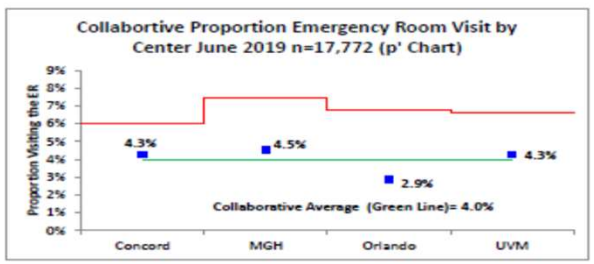

Concord Proportion Hospitalized by Quarter June 2019 (n=6,887)
Pproportion Hospitalized
Concord Average (Green Line) = 3.0%
1.6%
2.3%
3.2%
5.2%
2.5%
3.7%
3.2%
2.6%
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8
July 2017 - June 2019


Collaborative Proportion Hospitalized by Quarter June 2019 n=17,772 (p' Chart)
Proportion Hospitalized
2.4%
2.9%
3.8%
4.5%
3.3%
4.1%
3.7%
3.9%
Collaborative Average (Green Line) = 3.5%
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8
July 2017 -June 2019


Collaborative Proportion Hospitalized by Center June 2019 n=17,772 (p' Chart)
Proportion Hospitalized
3.0%
2.6%
4.1%
4.2%
Collabortive Average (Green Line) = 3.5%
Concord MGH Orlando UVM


Concord Proportion Visiting an Emergency Room by Quarter June 2019 (n=6,887)
Proportion Visiting an ER
Concord Average (Green Line) = 4.3%
4.2%
3.9%
4.3%
6.2%
3.3%
3.5%
4.9%
4.2%
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8
July 2017 - June 2019


Collaborative Proportion Visiting the Emergency Room by Quarter June 2019 n=17,772 (p' chart)
Proportion Visiting the ER
2.9%
3.6%
4.1%
4.8%
3.8%
4.6%
4.7%
4.1%
Collaborative Average (Green Line) = 4.0%
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8
July 2017 - June 2019


Collabortive Proportion Emergency Room Visit by Center June 2019 n=17,772 (p' Chart)
Proportion Visiting the ER
4.3%
4.5%
2.9%
4.3%
Collaborative Average (Green Line)= 4.0%
Concord MGH Orlando UVM

Collaborative Relapse Rate Reduction

MS-CQI COLLABORATIVE
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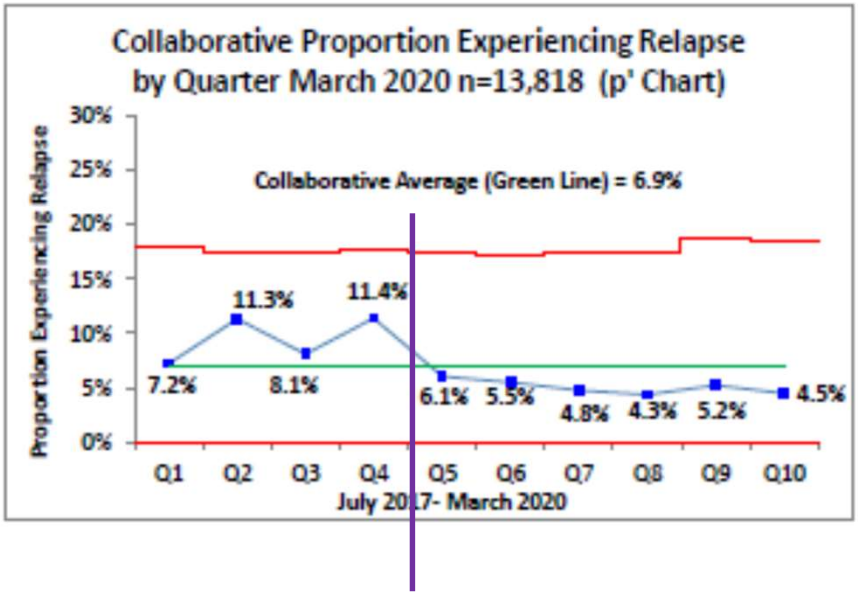


Sustained collaborative level population scale reduction in relapse rate post randomization to intervention…

Patient Experience and Co-Design: Qualitative PRO data…

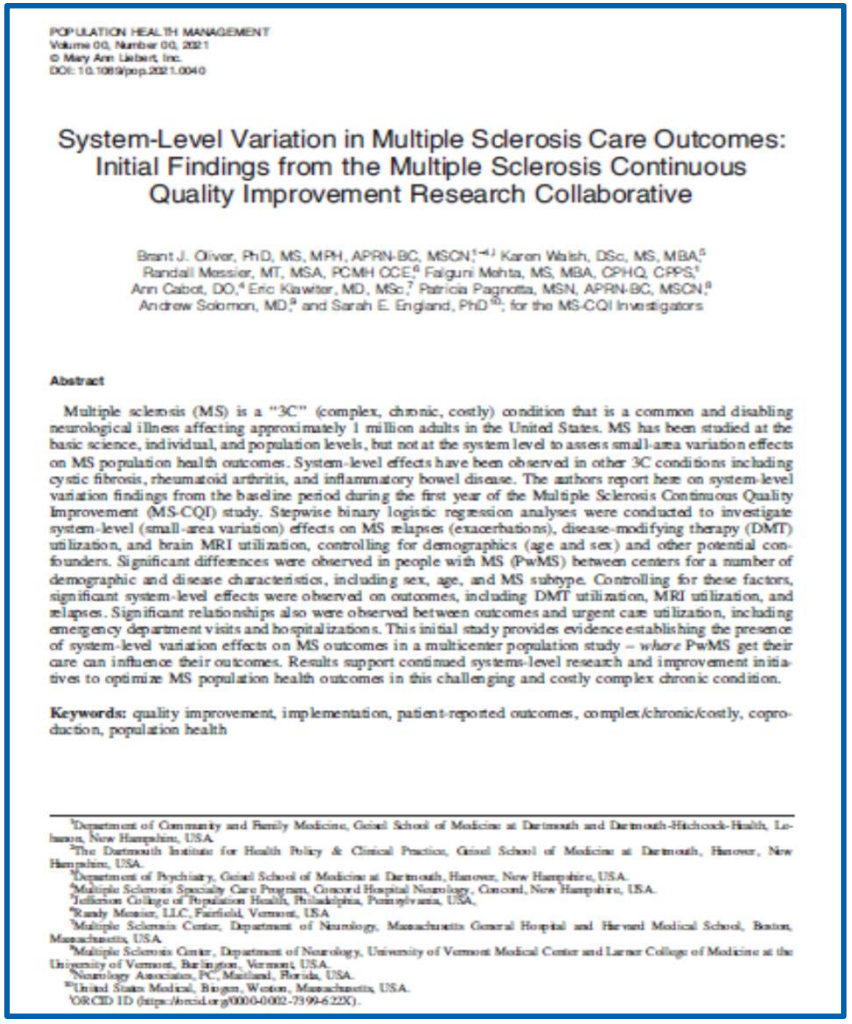
MS-CQI COLLABORATIVE
IMPROVING MS CARE TOGETHER

What does health and wellness mean to you?

The most important thing about my MS care is….

Research

- Same data infrastructure that informed improvement and implementation aspects
- Conducted in tandem with improvement and implementation activities
- Aggregated data analyses to answer research questions



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System-Level Variation in Multiple Sclerosis Care Outcomes: Initial Findings from the Multiple Sclerosis Continuous Quality Improvement Research Collaborative

Brant J. Oliver, PhD, MS, MPH, APRN-BC, MSCN,[1–4] Karen Walsh, DSc, MS, MBA,[5] Randall Messier, MT, MSA, PCMH CCE,[6] Falguni Mehta, MS, MBA, CPHQ, CPPS,[1] Ann Cabot, DO,[4] Eric Klawiter, MD, MSc,[7] Patricia Pagnotta, MSN, APRN-BC, MSCN,[8] Andrew Solomon, MD,[9] and Sarah E. England, PhD[10]; for the MS-CQI Investigators

Abstract

Multiple sclerosis (MS) is a "3C" (complex, chronic, costly) condition that is a common and disabling neurological illness affecting approximately 1 million adults in the United States. MS has been studied at the basic science, individual, and population levels, but not at the system level to assess small-area variation effects on MS population health outcomes. System-level effects have been observed in other 3C conditions including cystic fibrosis, rheumatoid arthritis, and inflammatory bowel disease. The authors report here on system-level variation findings from the baseline period during the first year of the Multiple Sclerosis Continuous Quality Improvement (MS-CQI) study. Stepwise binary logistic regression analyses were conducted to investigate system-level (small-area variation) effects on MS relapses (exacerbations), disease-modifying therapy (DMT) utilization, and brain MRI utilization, controlling for demographics (age and sex) and other potential confounders. Significant differences were observed in people with MS (PwMS) between centers for a number of demographic and disease characteristics, including sex, age, and MS subtype. Controlling for these factors, significant system-level effects were observed on outcomes, including DMT utilization, MRI utilization, and relapses. Significant relationships also were observed between outcomes and urgent care utilization, including emergency department visits and hospitalizations. This initial study provides evidence establishing the presence of system-level variation effects on MS outcomes in a multicenter population study – *where* PwMS get their care can influence their outcomes. Results support continued systems-level research and improvement initiatives to optimize MS population health outcomes in this challenging and costly complex chronic condition.

Keywords: quality improvement, implementation, patient-reported outcomes, complex/chronic/costly, coproduction, population health

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[5]Jefferson College of Population Health, Philadelphia, Pennsylvania, USA.
[6]Randy Messier, LLC, Fairfield, Vermont, USA.
[7]Multiple Sclerosis Center, Department of Neurology, Massachusetts General Hospital and Harvard Medical School, Boston, Massachusetts, USA.
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[9]Neurology Associates, PC, Maitland, Florida, USA.
[10]United States Medical, Biogen, Weston, Massachusetts, USA.
[*]ORCID ID (https://orcid.org/0000-0002-7399-622X).

https://pubmed.ncbi.nlm.nih.gov/34134513/

The power of promoting many…

The Learning Health System structure creates expanded opportunities engage in and disseminate real-world research (including opportunities for teaching and learning): https://chronichealthimprovement.org/publications/

An example from two conferences: https://chronichealthimprovement.org/news-and-events/ms-cqi-investigators-present-at-the-jonkoping-microsystems-festival-and-actrims/

From a PhD dissertation (Walsh et al., 2021): Predictive analytics https://www.msard-journal.com/article/S2211-0348(21)00597-6/fulltext

Experience of Multiple Sclerosis Centers Participating in the Multiple Sclerosis Continuous Quality Improvement (MS-CQI) Collaborative: A Qualitative Study

Alexander C,[1] Hakim H,[1] Mehta F,[1] Oliver BJ,[1-3] for the MS-CQI Investigators

[1] Department of Community & Family Medicine, Dartmouth-Hitchcock Health, Lebanon, NH; [2] Department of Psychiatry, Geisel School of Medicine at Dartmouth, Hanover, NH; [3] the Dartmouth Institute for Health Policy & Clinical Practice, Geisel School of Medicine at Dartmouth, Hanover, NH

Drs. Alexander and Hakim were DNP prepared post-doctoral fellows

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Methods

- This cross-sectional qualitative study explored the factors that either helped or hindered successful CQI in 4 MS-CQI centers: The four factors studied included leadership, resiliency, burnout, and COVID-19.

- A purposive sample of eight participants were selected.

- Participants were recruited through the four MS centers who participated in the MS-CQI study.

This qualitative study was nested underneath the core MS-CQI study…

Results

Leadership

- **Collaboration** and **leader attributes** are key

Burnout

- Participation in QI was found to be a **protective mechanism** against burnout (creating hope for the future).

Resiliency

- Working in a team **(collaborating)** created higher levels of resiliency.

COVID Impact

- **Telemedicine** visits during the pandemic had a **modifying effect of CQI efforts.**

Identified Key Leader *Attributes* and *Barriers*

Attributes	Barriers
Active listener	Resistance to change
QI knowledge	Lack of trust
Fair-minded	Lack of flexibility
Coach	Poor listening skills
Engage with team	

Burnout: QI as Protective Mechanism

Key Attributes

Work as a Team

Hope

"Leaders can get people excited about participation in QI. Makes things better, creates **hope for future"**

"QI adds a protective layer. **People get excited**. Everyone is working as a team, strategizing problems."

"QI done right is a **protective mechanism"**

QI can be overwhelming, but if it **(QI) is successful**, burnout does not occur"

Resiliency: Collaboration + Engagement

Key Attributes

Teamwork

"Collaborative improved the way we were seeing **patients- you are actively thinking about how to do things better"**

"Staff feel invested, feel like they are making a difference and when you feel fulfilled you feel happy at your job"

"Improving **cohesiveness of group leads to better understanding and how people can work together."**

"Staff are so much happier when they feel part of a team."

"When they are engaged in a study like this they feel like they are **part of something bigger, it makes sense to them"**

Flexibility during the pandemic…

Molaei M, Chen A, et al. (2021). Telehealth Utilization and Clinical Outcomes in Four MS Centers during the COVID Pandemic: Real-world evidence from the MS-CQI improvement research collaborative.

Matthew Molaei and Anna Chen were pharmacists and HEOR masters degree students co-supervised by Dr. Oliver at Dartmouth and Dr. Walsh at Jefferson College of Population Health…

Telehealth Utilization and Clinical Outcomes in Four MS Centers during the COVID Pandemic: Real-world evidence from the MS-CQI improvement research collaborative.

Molaei M, [1] Chen A, [1] Vaeth A, [2] Walsh K, [1] Mehta F, [3] Oliver BJ, [3-5] for the MS-CQI Investigators

[1] Jefferson College of Population Health, Philadelphia, PA; [2] Department of Neurology, Massachusetts General Hospital, Harvard Medical School, Boston, MA; [3] Departments of Community & Family Medicine and Psychiatry, Dartmouth-Hitchcock Medical Center; [4] The Dartmouth Institute for Health Policy & Clinical Practice, Geisel School of Medicine at Dartmouth; [5] Department of Psychiatry, Geisel School of Medicine at Dartmouth, Hanover, NH

MS-CQI COLLABORATIVE
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Table 3. Utilization by Visit Type for Rural vs. Urban Centers (Q11 & Q12)

Characteristics	Rural (CH, UVM) *Frequency (%)*	Urban (Orlando, MGH) *Frequency(%)* ǂ
Proportion of patients that had an In-person Visit	584 (49.03%)	305 (45%)
Proportion of patients that had a Telephone Visit	458 (38.46%)	64 (9%)
Proportion of patients that had a Televideo Visit	299 (25.10%)	207 (31%)
Total	1191 (100%)	675 (100%)

Table 4. Utilization by Visit Type for Academic vs. Non-Academic Centers (Q11 & Q12)

Characteristics	Academic (MGH, UVM) *Frequency (%)*	Non-Academic (Concord, Orlando) *Frequency (%)* ǂ
Proportion of patients that had an In-person Visit	287 (49.83%)	602 (46.67%)
Proportion of patients that had a Telephone Visit	73 (12.67%)	449 (34.81%)
Proportion of patients that had a Televideo Visit	263 (45.66%)	243 (18.84%)
Total	576 (100%)	1290 (100%)

Dartmouth-Hitchcock
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Table 3 and 4. Results from all MS outpatient clinical encounters from Electronic Health Records (EHRs) during Quarters 11 and 12. ǂ Orlando did not conduct phone visits during the study period.

Table 5. Adjusted Odds of Relapse-Free Status and DMT-Free Status by Visit Type (n=1,866)

Predicting Relapse Free-Status Based on Visit Method	Odds Ratio	95% Confidence Interval	P-Value
In-Person Visit*	0.502	0.255-0.988	0.046
Telephone	0.416	0.141-1.222	0.111
Video*	0.453	0.217-0.944	0.035

Predicting DMT Free-Status Based on Visit Method	Odds Ratio	95% Confidence Interval	P-Value
In-Person Visit*	0.552	0.382-0.796	0.002
Telephone	0.743	0.493-1.119	0.155
Video*	0.526	0.346-0.800	0.003

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** = Significant at the p<=.05 level.*

Breakout Questions

1) "*All models are wrong, some are useful*" – discuss how LHS thinking might change how you view opportunities for EBP, improvement, research, and health professions education.

2) How might LHS oriented activities help to promote clinical excellence and optimize outcomes in the setting of our current healthcare climate very challenging circumstances?

3) How could LHS approaches be used to reduce turnover, burnout, and moral injury in our healthcare environment?

4) What questions do you want to ask?

A new equation…